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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/586,221

07/14/2006

Christos Aneziris

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EXAMINER

HOBAN, MATTHEW E

ART UNIT

PAPER NUMBER

1793

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/586,221	<b>Applicant(s)</b> ANEZIRIS ET AL.	
	<b>Examiner</b> Matthew E. Hoban	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 November 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 10-18 and 20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10-18 and 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/10/2008</u>  | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

#### Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/14/2008 has been entered.

#### Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 10, 12, 13, 15, and 17-18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farrington et al in 3,903,025 in view of Boenigk et al in 5,262,043

The aforementioned claims of the instant application are directed towards a method of manufacturing a carbon bonded refractory product, comprising:

- Using organic binder agents comprising:
  - o a powdery graphitable coal-tar pitch with a benzo[a]pyrene content less than 500 ppm, a softening point of over 180 Celsius and a coking value of at least 80%
- where the coal tar pitch is distilled in a first distillation stage under normal or reduced pressure
- distilling a residue of the first distillation stage under a pressure of no more than 1 mbar in an evaporator with a temperature that ranges from 300 to 380 Celsius, where the residue has a mean residence time of 2 to 10 minutes
  - o a graphitable binder agent that is liquid at room temperature with a coking value of at least about 15% by weight and a benzo[a]pyrene content less than 500 ppm, where this agent is anthracene oil

- Mixing the organic binder agents and refractory granulations to form a mixture
- Adding carbon black or graphite to Said mixture
- Transferring said mixture to a molded body
- Heat treating said mixture at a temperature of 150 to 400 Celsius

3,903,025 teaches the process of making refractory bricks from dead burned magnesite (refractory granulation), carbon black (Relevant to Claim 17-.18), alkyd resin (oil modified alkyd), lignosulfonates, and pitch. The aforementioned ingredients are first mixed thoroughly and were molded and pressed into bricks. In order for this molding to occur, the mixture would inherently be "transferred to a molded body" although this statement isn't explicitly made by 3,903,025. This process notes no heating step between the mixing of the components and consolidation in a mold. Finally, the bricks are fired at a temperature between 270 and 300 Celsius (Relevant to Claim 10; See Example 1-7, Column 7 and 8).

3,903,025 does not teach the use or process of producing a coal tar pitch with the properties outlined by the instant claims, where in 3,903,025 a more generic pitch is used.

5,262,043 teaches the process of producing an organic binder and simple refractories, making use of this organic binder. The process begins by attaining a pitch from a residue of the primary distillation of coal tar, which normally occurs at an elevated temperature at normal pressures. This coal tar is then distilled in a second distillation stage at a temperature of 300 to 380 Celsius, at a pressure below 1 mbar. This process occurs in various types of evaporators, such as thin layer evaporators, spray film evaporators, and rotating evaporators (Relevant to Claim 12; See Column 1, line 56-Column 2, line 35). Standard tests were then performed to determine the softening point, coking residue and benzo[a]pyrene content of the distilled coal tar (See Column

3). Specific examples were performed showing that the resulting coal tar pitch had the following properties:

Second distillation performed at 300 Celsius (EXAMPLE 1):

BAP-content: 35 ppm

Softening temperature: between 156 and 194

Average stay period (residence time): 5 minutes

Coking value: 83.3%

Second distillation performed at 340 Celsius (EXAMPLE 2):

BAP-content: 20 ppm

Softening temperature: between 193 and 237

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Average stay period (Residence time): 5 minutes

Coking value: 88.5%

In the above examples, the softening temperature is taken as being between the beginning of melting and the Termination of Melting as stated by the patent (See Column 2, lines 16-23) (Relevant to Claim 15).

The pitch as made in Example 1 above was then mixed with an anthracene oil (graphitable binder agent), having 40 ppm benzo[a]pyrene to create a binder. This was made using 72 parts of the pitch as in example 1 and 28 parts of the anthracene oil (Relevant to Claim 10 and 13; See Example 4). The resultant binder had 40ppm benzo[a]pyrene and a coking value of 63.8% (See Properties in Column 4). Therefore the organic binder of 5,262,043 is made up of coal tar pitch and anthracene oil, where coal tar pitch would have to be added and mixed at a finite rate. Therefore, the coal tar pitch and anthracene oil mixture must inherently still be liquid at some point and have a coking value of at least 15%. At this point the amount of pitch in the anthracene oil, which is also a high boiling aromatic oil is between 10 and 65% by weight. This is true because the two components of the mixture are of the same composition and would inherently have the same properties because of this. At this point, the mixture of pitch and oil could be considered the "liquid graphitable binder" of the claims, while the pitch that is to be further added is considered the "powdery graphitable coal tar pitch" After this point is reached, more coal tar pitch is added until there is 72 parts pitch to 28 parts anthracene oil.

Furthermore in reference to the organic binder as a whole (Relevant to claims 10, 12-15), the pitch of the instant application has been stated to be the same as that of 5,262,043 by the applicant, as evidenced by the International Preliminary Report on Patentability, where the ISA states on page 4 of the translation, "As the applicant himself already admitted, this coal-tar pitch is identical to the coal-tar pitch in the [instant] application." The final product of this process would be a refractory product with graphite-like carbon structure comprising a content of benzo[a]pyrene of less than 50 mg/kg, which stems from the fact that the components making up the refractory product all have a benzo[a]pyrene content of 50 mg/kg or less (Relevant to Claim 19). The graphite-like carbon structure would be produced from firing the carbon black in the composition, as well as graphitizing the binding agents.

It would have been obvious to one of ordinary skill in the art to use the organic binder agents of 5,262,043 in the process of 3,903,025, in place of Farrington's binder. This new process would make a product comprising magnesite, carbon black, anthracene oil, and pitch. The anthracene oil and pitch would have all of the characteristics of the two binder products as seen in 5,262,043, most importantly their low benzo[a]pyrene content. This combination would provide a refractory body with graphite-like carbon structure comprising a content of benzo[a]pyrene of less than 50 mg/kg, which stems from the fact that the components making up the refractory product all have a benzo[a]pyrene content of 50 mg/kg or less (Relevant to Claim 19). The graphite-like carbon structure would be produced from firing the carbon black in the

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composition, as well as graphitizing the binding agents. Low levels of carcinogenic material in the refractory means that it is safer to work with and around and would comply with current standards regarding such products. This reason provides sufficient motivation to combine the two inventions, which are also from analogous arts of production of refractory binders using coal tar pitch. Furthermore, 5,262,043 explicitly mentions that it could be used for all binding purposes that conventional pitches can be used for (See Column 3, lines 55-57). 5,262,043 is silent as to the crystalline structure of his binder, but the binder must also be of an anisotropic structure. The binder of 5,262,043 is of the same composition and goes through the same processing steps as that of the instant claims so it must also inherently have the same structure and characteristics.

2. Claims 11 and 14 rejected under 35 U.S.C. 103(a) as being unpatentable over Farrington et al in 3,903,025 in view of Boenigk et al in 5,262,043 and further in view of Hildinger et al in 3,285,760.

Claims 11 and 14 of the instant application further define the organic binding agent used in the method of making the refractory body. These claims state that the organic binder agents comprise .5 to 4% by weight of the powdery, graphitable coal tar pitch and 1.3 to 4% by weight of said graphitable binder agent. The coal-tar pitch further has a mean grain size of 10 to 500 microns. Please refer to the previous 103 rejection to gain insight into the other claim limitations as well as the teachings of the prior art in 5,262,043 and 3,903,025.

3,285,760 teaches the production of a refractory body using various metal oxides, and a coal-tar pitch/heavy oil binder. Specifically the coal tar pitch of 3,285,760 has a particle size that passes through a 65 Tyler mesh, meaning that the particle size is less than 230 microns. 3,285,760 goes on to teach the amount of binder to be used in the refractory body, where 2.4% of this coal-tar pitch, and 3.7% of heavy oil by weight are used in the refractory. These two weight percents as well as the particle size read on claims 11 and 14 directly (Relevant to Claims 11 and 14; See Example 1, Column 3).

It would have been obvious to one of ordinary skill in the art to combine these two inventions as the use of the binding agents as disclosed by 3,285,760 would improve the properties of the refractory body made from the pitch of 5,262,043 using the process of 3,903,025. The correct amount of oil and pitch would create an exemplary body with increased properties. The disclosures of 5,262,043 and 3,903,025 do not disclose the amount of both binder and pitch used. Although 3,903,025 uses 3% alkyd resin (a binder) and 2% pitch in its composition (See Table 1), it is not inherent that an anthracene binder would be used in the same proportion. However, 3,285,760, which uses a heavy oil at 3.7% Shows that these two oils are replaceable in relatively similar amounts. The use of the proportions and particle size as disclosed by 3,285,760 in the organic binder of 3,903,025, which would then be used in the

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production of a refractory body as outlined by 5,262,043 would have been obvious to one of ordinary skill in the art in order to create a solidified body, which would not crack or suffer from other deficiencies. The particle size of the pitch is an important parameter, due to the fact that the binder must be used to "bind" refractory particles. An optimal particle size, as taught by 3,285,760, would ensure that the refractory particles create a uniform refractory body. This body would also exhibit better properties than other carbon bonded refractories, as it would contain fewer carcinogens. All of these inventions represent analogous art, as they all refer to carbon banded refractories. Claims 16 rejected under 35 U.S.C. 103(a) as being unpatentable over Farrington et al in 3,903,025 in view of Boenigk et al in 5,262,043 and further in view of Crawley in GB- 690,859.

Claims 16 of the instant application further defines the method of making the refractory body. This claim' states that a naphthenic oil is added to the coal-tar pitch before mixing and the naphthenic oil does not dissolve the pitch. Please refer to the first 103 rejection to gain insight into the other claim limitations as well as the teachings of the prior art in 5,262,043 and 3,903,025.

Crawley teaches the use of kerosene, petrol, turpentine, or white spirit (referred to in the US as naphtha) as a lubricant in the manufacture of refractory bodies bonded by carbon pitch (Line 46-52). All of these oil based products are considered naphthenic oils. It is stated by Crawley that these lubricants would not dissolve the pitch (Line 47), and cause the refractory to be more easily molded. As Crawley does not use an anthracene oil in his teachings, it is not stated whether this naphthenic oil should be added before or after the anthracenic; however, Crawley states that the naphthenic oil interacts with the surface of the pitch (Lines 53-61). This interaction would obviously occur more readily when the naphthenic oil was added to the pitch first (i.e. before mixing occurred). The inclusion of a naphthenic oil, as taught by Crawley, into the organic binder of 5,462,043 would have been obvious to one of ordinary skill in the art at the time of the invention, because the inclusion of such an oil would increase the density of the refractory and would cause production to be easier. The motivation for this improvement is taken directly from Crawley's patent, where it is stated that "the composition is more easily consolidated on ramming or moulding" and would avoid the disadvantages of a "relatively high porosity" and the creation of "swelling and distortion" during molding (See Lines 10-20 and Lines 54-65).

#### Response to Arguments

Applicant argues that the use of anthracene oil does not meet the claim language. It is stated that the pure anthracene does not include graphitable content and only has a coking value of 2%.

However, the rejection and previous arguments were based on the instant graphitable content and coking value as pitch was being dissolved in the anthracene. This is the same process as seen in

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the creation of such a binder in Example 2 of the instant specification. Applicants arguments against Boenigk generally seem to contradict these examples as well as claim 13. Applicant goes on to argue that Example 4 only teaches the mixing of the two products at 200C, but Boenigk's disclosure is not relied upon to teach the method of making, but only the pitch of the instant claims. Farrington is relied upon to teach the method of cold molding such a product.

Furthermore, applicant goes on to argue the combination of the references stating that there is no reason for one of ordinary skill to look from one reference to the other. The motivation to combine simply put, comes in light of the lower benzo[a]pyrene content exhibited by Boenigk. Furthermore, Farrington notes that the cold molding process as opposed to the hot molding process inherently would also limit the worker's exposure to the carcinogenic byproducts of heating such a mixture. This disclosure in and off itself clearly shows that one of skill in the art knows advantages of both cold and hot molding and would see beneficial teachings from either as applicable to the other.

Finally Applicant argues against Farrington and its combinability with Hildinger, but the rejection is not based on these two teachings alone. Furthermore, no reason is given.

2. In response to applicant's argument based upon the age of the references, contentions that the reference patents are old are not impressive absent a showing that the art tried and failed to solve the same problem notwithstanding its presumed knowledge of the references. See *In re Wright*, 569 F.2d 1124, 193 USPQ 332 (CCPA 1977).



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3. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Hoban whose telephone number is (571) 270-3585. The examiner can normally be reached on Monday - Friday from 7:30 AM to 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J.A. LORENZO/  
Supervisory Patent Examiner, Art Unit 1793

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